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STORIES BY CONNIE BRYSON

FOCUS ON ALBERTA RESEARCH COUNCIL

Research and development. Companies do it, universities do it, even government departments do it. But few organizations make R&D their only business. One of them is the Alberta Research Council.

The provincial Crown corporation was established in 1921. Other provinces would follow this bold move, but much later. From the outset, the objective was clear – to support economic development through the application of science and technology.

Important as that objective was in the 1920s, it is critical today as world trade becomes increasingly focused on advanced technology. The winners in the global economy are the scientific and technological achievers.

Now approaching its 70th birthday, the Research Council has a substantially larger and more comprehensive capability than equivalent organizations in other provinces. It has evolved from a centre for the survey of the province's physical resources to a catalyst for the application of advanced technologies to Alberta's traditional industries.

"The coupling of our two engines of growth is crucial," says Alberta Research Council president Dr. Clem Bowman. "Our resource-based industries must make continual improvements in reducing costs and in increasing product value by applying advanced technologies.

"Our emerging high technology companies could greatly increase their chances of landing international contracts by first demonstrating their products and services in our domestic market. Alberta is leading the way in capturing this Canadian advantage."

Linking high technologies and resource industries is at the heart of the Alberta Research Council's strategic plan for the 1990s. In January the organization was restructured to better carry out this role. There are now two research divisions: one representing all the resource technologies, the other, advanced technologies.

Success Stories

There are already success stories. Help from the Research Council enabled a Calgary truck-spring manufacturer to automate. But, putting science and technology to work in an industrial setting isn't easy. Companies must first know what the new technologies are. That requires them to keep abreast of advances throughout the world. Secondly, new technologies can rarely be dropped into existing operations – they must be tailored to fit. Success depends on having top-notch scientific expertise, proper facilities and equipment, and money.

Enter the Alberta Research Council. The 600-employee organization has experience with every sector of the provincial economy – petroleum, forestry, agriculture, manufacturing, the service sector, the environment, and large and small companies.

There's no scientific myopia here. The Research Council's scientists and technologists make it their business to keep current with international developments. Projects have been undertaken in countries such as Indonesia, China, India, Vietnam, Cuba and Japan.

"We recognize that Alberta companies compete internationally," says Dr. Arvid Hardin, head of the coal and hydrocarbon processing department. "So the Research Council must also work on an international basis. Anything less would be letting our clients down."

But knowledge and expertise aren't everything; they must be supported by well-equipped R&D facilities. The Research Council's world-class laboratories adjacent to the Edmonton Research Park, sophisticated coal research facility at Devon, oil sands lab in east Edmonton, and advanced manufacturing demonstration facility in Calgary are only a sampling of the facilities available to industry.

Appropriate financing is often a barrier to the adoption of new technology by the private sector. The Research Council has responded to this challenge by establishing innovative financing arrangements which include contracts, joint research ventures and access to provincial and federal funding programs.

The Bottom Line

"The Research Council's business is research. We are professionals at managing and funding research operations," says Dr. Bob Fessenden, resource technologies vice-president.

"We also understand the bottom line. Our work is geared to producing a quality product or end result at the lowest cost."

Joint research ventures are helping Edmonton's Myrias Research Corporation to develop parallel processing software for the petroleum industry, and Calgary's DataSpan Technology Inc. to develop innovative software for the Land Related Information Systems (LRIS) market.

Another joint research venture helped Intera Technologies Ltd. land the Canadian government's multi-million-dollar ice reconnaisance contract. A unique computer work station, developed jointly by the Research Council and Calgary's Q.C. Data Collectors Ltd., was one of the reasons Q.C. Data won the federal government's first map digitization contract.

With an eye on Alberta's future, the Research Council is moving into new areas which may one day open up new opportunities for Alberta industry. One of these is hydrogen, believed by many to be the fuel of the future. The Research Council is playing a lead role in developing this technology.

The manufacturing technologies department is reponsible for the Research Council's new initiatives in advanced materials.

"Our department has the scientific expertise to understand the latest developments in advanced materials and put them to use in industry," says department head Dr. Ted Heidrick.

"Advanced materials are key to maintaining the competitiveness of Alberta's established industries and ensuring the success of our emerging industries."

In a short period of time, the Research Council has established an impressive track record in space research. Scientists are developing automation and computer control technologies for the Space Station, designing "bioreactors" to supply life support on extended space missions, and studying advanced materials manufacturing in space.

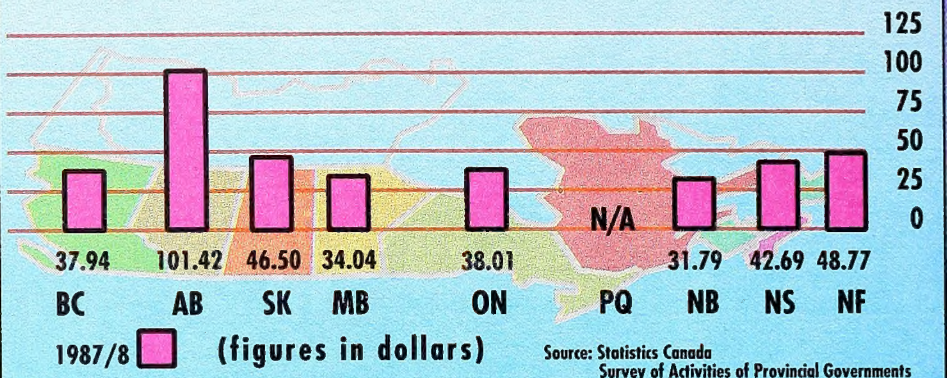
By staying at the forefront of advanced technology, the Research Council ensures a place for Alberta products and services in international markets now and in the future.

The Research Council's world-class laboratories are adjacent to the Edmonton Research Park.

ALBERTA TOP SPENDER ON SCIENTIFIC ACTIVITIES

The Alberta government commits several-fold more per capita to scientific activities than any other provincial government.

Per Capita Provincial Expenditures on Scientific Activities



Source: Statistics Canada
Survey of Activities of Provincial Governments

NETWORKING PAYS OFF

Links help Albertans access the best technology in the world

Sometimes being good just isn't enough. For Alberta businesses to compete internationally, they need access to the best technology – not just the best in Alberta or Canada, but the best in the world.

"There are a limited number of world-class technology centres in Canada, and in these areas we can compete with anyone," says Dr. Ted Heidrick, head of manufacturing technologies with the Alberta Research Council.

"But in other areas we must acquire the leading technologies. World markets are unforgiving of anything that's not the best."

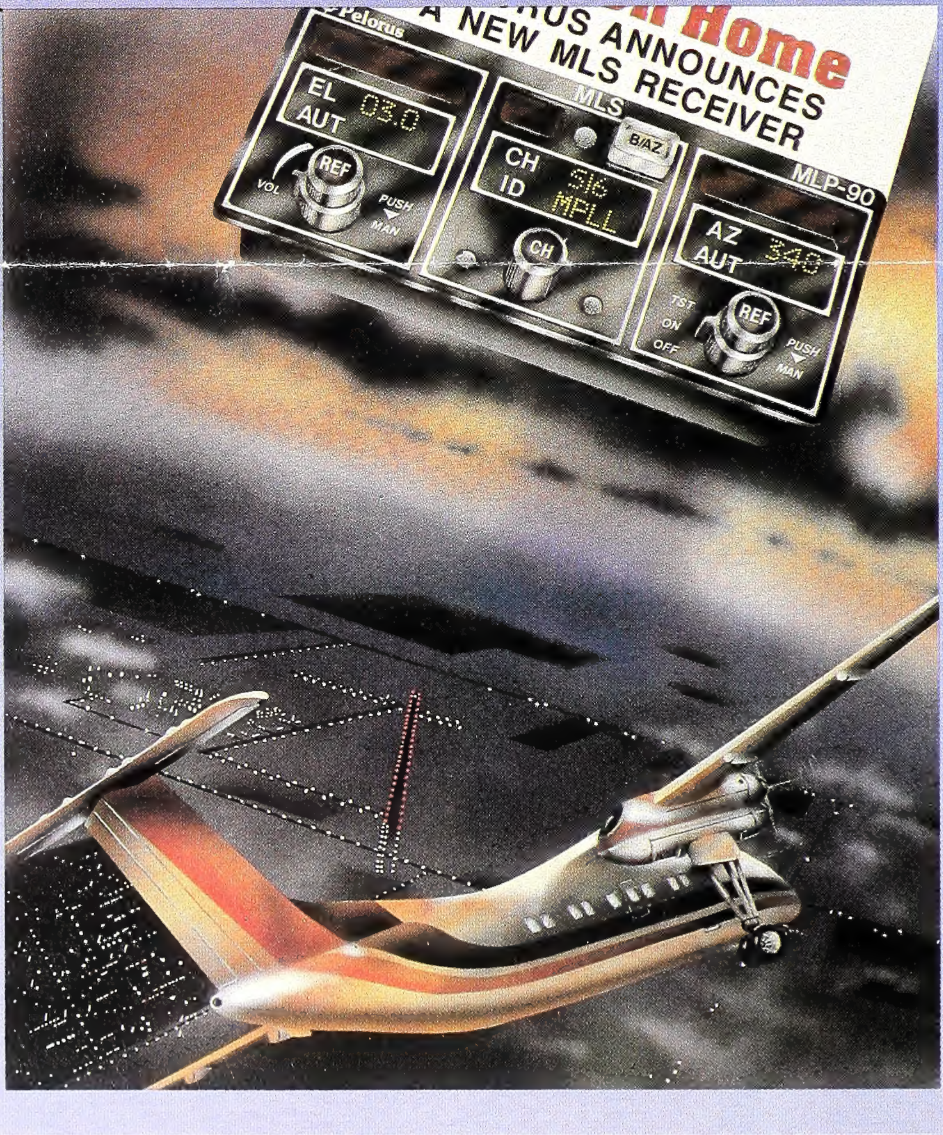
To gain access to leading technologies, the Research Council networks with provincial, national and international research consortia and organizations. Co-operative agreements are signed with government departments, universities, colleges, and research institutes.

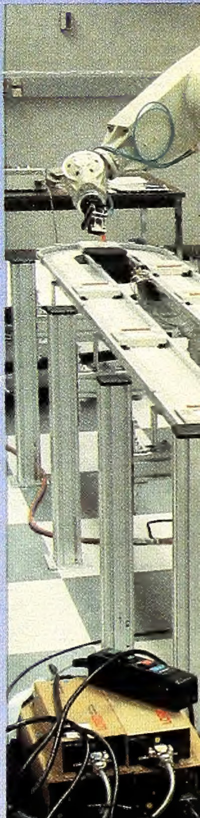
"One organization can't do everything. Networking allows us to use the capabilities of other organizations and, in turn, they can use the Research Council," says Duncan Currie, vice-president, development and planning.

"By taking advantage of complementary facilities and skills, we avoid duplication. As a result of these linkages, the Alberta Research Council can offer industry a comprehensive range of services."

Networking has resulted in a competitive advantage for Pelorus Aviation Supplies (Canada) Ltd. In a joint venture with the Research Council, the Calgary company is developing a new electronic airborne receiver, providing approach guidance for aircraft.

Pelorus Microwave Landing System (MLS) receivers incorporate "monolithic microwave integrated circuits" and so will be smaller, easier to manufacture, and more reliable than competing receivers. Pelorus was able to access this new technology because the Research Council has an agreement with the Communication Research Centre in Ottawa.





Engineers Ann Fincati and Henry Voss assemble the Pharm/Hand automated robotic work cell.

GIVING THE MEDICAL WORLD A HAND

Given Alberta's acknowledged leadership in medical research, it's only natural that the province develop medical technology for world markets. The Alberta Research Council has already had success in this area with "Pharm/Hand," a table-top robot for filling intravenous bags.

The idea for Pharm/Hand came from the Red Deer Regional Hospital Centre which saw automation as an opportunity to free staff from a repetitive and time-consuming task. The Research Council undertook feasibility and design studies, and built a prototype system. The hospital plans to refine the prototype into a commercial product.

"At the outset our relationship with the Research Council was a contractual one," says Roger Walker, Red Deer Hospital vice-president. "But the relationship has evolved beyond that to a shared interest. I think that's part of the reason for the success of the project."

SMALL BUSINESS REAPS ADVANTAGE

State-of-the-art facilities help smaller companies test new methods

While many large corporations have their own research departments complete with state-of-the-art equipment and experienced staff, these are usually beyond the means of smaller companies. Yet adopting new technology to gain greater productivity or access to new markets is vital to the success of any business.

"The trend toward globalization of markets is creating a need for a complete reassessment of the way Canadian industry goes about making products," says Dr. Brian Barge, vice-president, advanced technologies.

"Manufacturing companies require new approaches and new methods - intelligent systems, automation, robotics, quality management. This is a fact of life."

The testing facilities and information services of the Alberta Research Council are geared to this new reality. Companies aiming to revamp their manufacturing facilities can get acquainted with new technologies at the advanced manufacturing demonstration facility in the Research Council's Calgary office.

"What we have now is a prototype factory floor," explains demonstration facility manager Ken Gamble. "Companies can come to the facility and see the alternatives to current technologies. We also offer an apprenticeship program in which companies can use the facility to try out the different parts of a computer-integrated enterprise."

The Research Council recently announced a new program to help Alberta companies with product and process development problems. The Product Development Assistance Program, run jointly with the Southern Alberta Institute of Technology, will put the resources of both institutions at the disposal of Alberta industry.

The manufacturing technologies department offers a wide range of product development services. The department's testing facilities have helped Alberta companies gain the credibility they need to compete in the tough international marketplace.

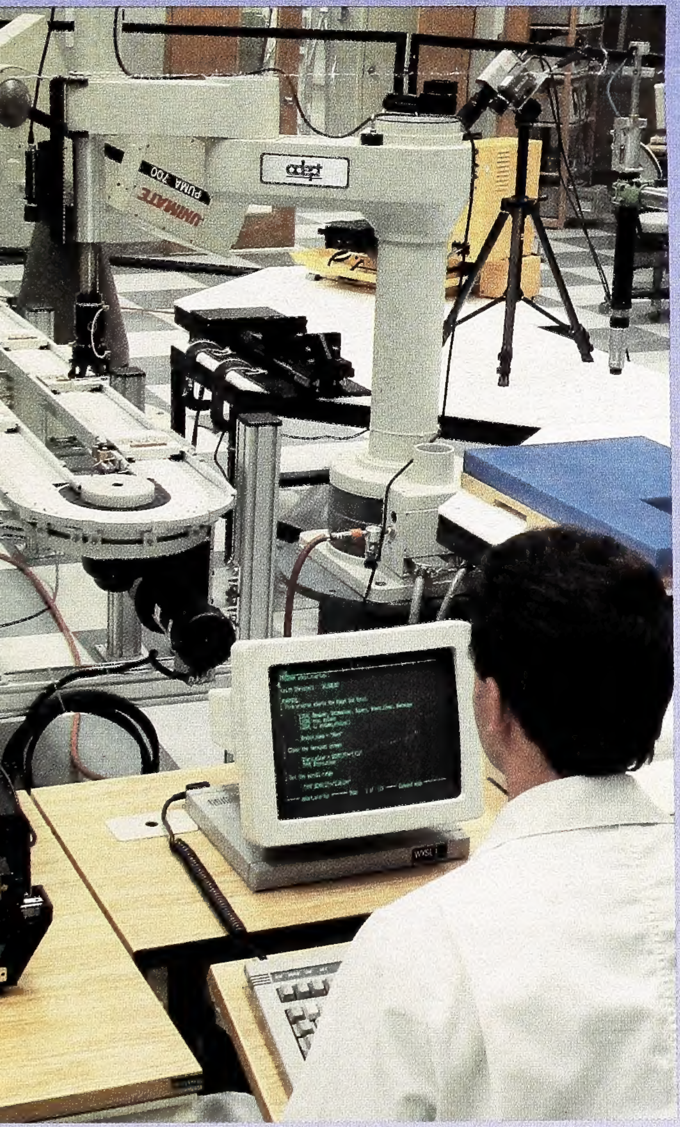
The industry with perhaps the most rigorous testing requirements is the electronics industry. Even many large companies can't afford the sophisticated test equipment needed to meet regulatory requirements.

"This is why the Electronics Test Centre gives the Alberta electronics industry a distinct advantage," says test centre manager Brian Young. The centre is a not-for-profit organization managed by the Alberta Research Council.

"Testing used to be done in Eastern Canada or the United States and that meant increased cost, time and frustration for local manufacturers. The windows of opportunity in electronics are narrow. A month's delay and a market can be missed."

No longer do Alberta companies miss out on Department of National Defence contracts. The Electronics Test Centre is approved for DND testing, making it much easier for local sub-contractors to bid on these projects.

The test centre recently teamed up with Amtek Testware of Edmonton and Calgary's EDO to successfully bid on the provision of an automatic test station for the CF-18 fighter jet. Delivery is scheduled for this summer.



Engineer Pat Feighan monitors the assembly operation at the Research Council's advanced manufacturing demonstration facility.

ROBOT CREATES JOBS

Automation has transformed the assembly line of Calgary-based Standen's Limited, one of Canada's largest manufacturers of truck springs. What's more, it has created jobs.

With assistance from the Alberta Research Council, Standen's installed a robot to take the place of workers who load heavy metal truck springs into a large industrial press.

Three jobs in this crowded, dirty and noisy environment were replaced by three new jobs downstream of the robot. Another job was created to tend the robot.

"There are too many doom and gloom predictions of how science and technology will take away jobs," says Research Council president Dr. Clem Bowman. "The Standen's example shows that the reverse is true. If Canada ignores the global advances in science and technology, the negative impact on Canadian industrial jobs will be catastrophic."

ALBERTA RESEARCH COUNCIL
TECHNOLOGY LINE
Call Toll Free: 1-800-661-2000
In Edmonton: 450-5000
Mon. - Fri. 8:30 a.m. - 4:30 p.m.

PROUD HISTORY, CHALLENGING FUTURE

The Alberta Research Council has an outstanding record of achievement in establishing technological beachheads. Electronics, biotechnology and advanced computing are only some of the initiatives the provincial research organization has undertaken in the advancement of high technologies across a broad front.

New ideas, new technologies with new applications are the Research Council's building blocks.

The Research Council is a catalyst for the national and international flow of technology, particularly in oil sands, coal and hydrocarbon processing. Its ties in the international scientific community, and its representation abroad as a Crown corporation, offer door-openers for Alberta industry.

Above all, the Research Council's resources are used to find innovative and effective technology to meet the short- and long-term needs of its clients, thereby promoting the economic development of the province.

As it looks forward to its 70th anniversary in 1991, the Alberta Research Council is an organization with a proud history, a vigorous present and a challenging future in its commitment to science and technology.

Fred D. Bradley, M.L.A.
(Pincher Creek - Crowsnest)
Chairman of the Board
Alberta Research Council

Jim Melnichuk conducts stain resistance tests on countertop samples.

ULTIMATE TESTS

When you're going up against the big guys in the international marketplace, you want to make sure you've got what it takes. That's where the Alberta Research Council's manufacturing technologies department comes in.

Edmonton-based Intercontinental Marble Corporation of Canada (IMC) came to the department for testing to support the marketing of CANDORA™. The synthetic countertop material is in direct competition with products made by American and Japanese corporate giants. IMC needed to back up its claims for CANDORA with comprehensive test results.

The same requirement brought Calgary's Canadian Flamecoat Systems Inc. to the Research Council. Flamecoat has entered a joint research venture to design high-capacity systems for thermoplastic spray coat technology. The coatings are resistant to corrosion and abrasion, and are used in industries ranging from pulp and paper to oil and gas.

"There aren't many labs in Canada that have the testing facilities available at the Alberta Research Council," says Flamecoat president Randy Gosselin. "And because the labs are approved by standards boards and agencies, our product will have credibility in the marketplace."

FANNING THE FLAME

Advisory network kindles entrepreneurial sparks

The Research Council helped a toymaker's dream become reality.

When entrepreneurs have the spark of innovation in their eyes, expert help can make the difference between turning the spark into a flame or extinguishing it completely. Fanning the flames of innovation is the job of the Industrial Technology Advisor Network.

The network is jointly administered by the Alberta Research Council and the National Research Council. Industrial Technical Advisors (ITAs), located in Edmonton, Calgary, Lethbridge and Red Deer, administer the National Research Council's Industrial Research Assistance Program (IRAP).

Help isn't always measured in dollars. ITAs must also be supporters of new ideas.

"Proposals come from people you wouldn't expect," says Edmonton-based ITA Lou Beres.

"Take the two high school teachers with an idea for a new electronic security system, or the social worker with a line of educational toys, or the auto body shop operations manager with a laser measuring device for alignment of automotive frames.

"You might be tempted to ask these people, 'Who are you to know about new technology?' But that's the wrong question. ITAs must find out how serious the entrepreneur is and evaluate the innovativeness of the product. If it's a good idea, we can get them all the technical help they need."

As it turns out, good ideas do come from unlikely places. The high school teachers formed Identity Systems International Inc.; negotiations are underway to install their electronic security system at the University of Alberta Hospital. A prototype of the laser-based automotive frame alignment system, made by a new company, Global Laser Systems, is proving to be the most accurate and least expensive on world markets.

And the toys? Educo International Inc. is now the largest toy manufacturer in Western Canada. The company sells 75 per cent of its toys to the U.S. and recently concluded a Pacific Rim export agreement.

At the opening of Educo's Sherwood Park plant in 1989, company owner Kathy Klaus said: "This building, this new manufacturing plant, this dream of ours became possible and a reality through the considerable efforts of the Alberta Research Council, the IRAP program and the people behind it."

Terrain scientists Bob Howitt and Brenda Sawyer collect soil survey data to support land use decisions.

FERMENTING GOOD IDEAS

Pilot plant lessens risk in biotechnology ventures

Biotechnology is a high-risk, capital-intensive business. Companies seem to spring up overnight and disappear almost as quickly. Often the lesson they learn is that a great idea in the laboratory doesn't necessarily translate into a marketable product.

For all its pitfalls, biotechnology represents a unique opportunity for diversification of the Alberta economy. The key lies in transforming research into marketable commodities. That's where the Alberta Research Council's pilot plant facility comes in.

"It can cost a company $10 million just to see if a process will work on a pilot scale. Then they must essentially throw that $10 million away and build a full-scale plant," says biotechnology department head Dr. David Cox.

"The Research Council offers an alternative to this massive investment by providing the pilot scale facility and scale-up expertise. We're the only organization I know of that will do these things without either taking a large profit or demanding equity in the company. Instead, we ask for a tangible commitment to Alberta."

The policy has already had results. The economic and technical advantages of having scale-up work and production done at the same place have brought a number of companies to the Research Council.

Biosys Inc., a California bio-technology company, uses the pilot plant to produce a strain of microscopic nematodes for biological pest control. Another California company, Protein Polymers Technology Inc., is scaling up production of synthetic proteins.

Saskatoon-based Philom Bios Inc. came to the Research Council for scale-up work on biological herbicides and inoculants.

"We need quality, reliability and reproducibility," says Philom Bios president John Cross.

"Because the Alberta Research Council has one of the best fermentation facilities in North America, we know our product will meet these criteria. In the biotechnology business, quality assurance is Number One."

ENVIRONMENT IS A PRIORITY

Technology development goes hand-in-hand with environmental awareness

The environment may be today's hot topic, but it's been a long-standing interest of the Alberta Research Council.

"We've recognized that technology development must go hand-in-hand with environmental awareness," says Dr. Bob Fessenden, the Research Council's resource technologies vice-president.

"Our ability to pull together multidisciplinary research teams ensures that all aspects of a project – from technical viability to environmental impact – are considered."

The forestry department carries out research aimed at developing Alberta's forest industry. This includes applying technology to increase production efficiency and develop new value-added forest products. But Research Council studies are not limited to the use of forest resources. They also encompass the impact of that use on Alberta's forests.

"The Research Council is playing a major role in gathering baseline data on Alberta's soils, groundwater and rivers," says forestry department head Peter Williams. "Background studies are necessary to establish norms before prescribing limits to development."

Environmental impact is also an issue in the energy industry. Wastes such as coal ash, oil sands tailings and drilling muds are usually buried or spread on the land near the plant site. Two departments – environmental research and engineering, and hydrocarbon recovery – are developing environmentally safe disposal alternatives for these wastes.

Technology can also be used to clean up the environment. In the coal and hydrocarbon processing department, work on a coal agglomeration technology led to a new method for the clean-up of oily waste.

The original purpose of agglomeration research was to improve Alberta coals. High percentages of water and non-combustible mineral matter reduce their heating value and increase transport costs. Agglomeration takes these low quality coals, processes them with heavy oil, and produces agglomerates with reduced water and mineral matter contents.

"The beauty of research is that you can start down a path and along the way see opportunities," says department head Dr. Arvid Hardin. "This is what happened with our agglomeration research.

"We found that the same process will clean oil-contaminated soil. You end up with a treated soil that is environmentally non-hazardous."

ENVIRONMENTAL MATCHMATKERS

Don't ditch that waste! Call the Alberta Waste Materials Exchange (403-450-5408). Funded by Alberta Environment and operated by the Alberta Research Council, the unique service matches companies that have waste with those which can use it.

Exchange manager Bill Kay recently found a use for 900 tons of spent catalyst. Hauling it to a landfill or incinerator would have cost its owner, an oil company, about $200,000.

The Waste Exchange identified two companies interested in recovering the minerals in the catalyst. A deal was made that not only saved the oil company money, it reduced the volume of waste.